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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/730,148

12/08/2003

Takahashi Hidehiro

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EXAMINER

FLORES, LEON

ART UNIT

PAPER NUMBER

2611

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/08/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/730,148

Applicant(s)

HIDEHIRO ET AL.

Examiner

Leon Flores

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-6 is/are allowed.
- 6) ☒ Claim(s) 7, 9, 10, 12 and 13 is/are rejected.
- 7) ☒ Claim(s) 8 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. **Claims (7, 9, 10, & 13) are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al (hereinafter Smith) (US Patent 5,796,772), in view of Jensen et al (hereinafter Jensen) (US Patent 6,362,762 B1).**

2. Re claim 7, Smith discloses a multi-mode communication device operable in a first mode and a second mode, comprising: convolution modules for multiplying filter

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factors with the output of the delta-sigma modulator in the first mode to generate first-mode waveforms (In Smith, see fig. 2: 101 & 113, see col. 6, lines 33-35. Furthermore, one skilled in the art would know that narrowband system may include delta-sigma modulator as means for converting the analog signal to digital. When operating in the first mode (narrowband) element 101, element 101 may include a delta-sigma modulator.), and multiplying PN codes with the output of the analog-to-digital converter in the second mode to generate second-mode output waveforms (In Smith, see fig. 2: 101 & 107 & col. 6, lines 33-35. Element 101 include analog-to-digital converters.); and output means for outputting the first-mode waveforms after a predetermined delay in the first mode to restore first-mode output waveforms and outputting the second-mode output waveforms without the predetermined delay in the second mode. (In Smith, see fig. 2: 103. Mode controller 103 selects which mode the transmitter will be operating on. It can either operate on a first mode (narrowband) or a second mode (wideband). Furthermore, the timing & delays of such systems are very well known in the art.)

But the reference of Smith does not specifically disclose a switching means for switching received analog signal to a delta-sigma modulator in the first mode and to an analog-to-digital converter in the second mode. However, Jensen does. (See Abstrat & col. 6, lines 19-29, 53-67, & col. 7, lines 1-15.)

Jensen discloses a multiple mode analog-to-digital converter. A wideband mode is provided by coupling an analog signal to be digitized directly to a quantizer. A narrowband mode are provided by switching the analog signal to be digitized into one of several delta-sigma modulator.

Therefore, taking the combined teachings of Smith & Jensen as a whole, it would have been obvious to one of ordinary skill in the art to have modified the system of Smith in the manner as claimed, as taught by Jensen, for the benefit of providing analog-to-digital converters to support both wide and narrow frequency bands. (See col.1, lines 7-8)

3. **Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al (hereinafter Smith) (US Patent 5,796,772) and Jensen et al (hereinafter Jensen) (US Patent 6,362,762 B1), and further in view of Xiaowei Zhu et al (hereinafter Zhu), "The RF module Design for W-CDMA/GSM Dual Band and Dual Mode Handset", State Key Laboratory of Millimeter Waves, Department of Radio Engineering, 2001 IEEE.**

4. Re claim 9, the combination of Smith & Jensen further discloses that wherein the analog signal received in the first mode is GSM signal (In Smith, see col. 19, lines 49-51), but the references of Smith & Jensen fails to specifically disclose that the second mode is WCDMA signal. However, Zhu does. (See abstract) Zhu discloses RF front-ends for GSM/W-CDMA dual band and dual mode mobile terminal.

Therefore, taking the combined teachings of Smith, Jensen & Zhu as a whole, it would have been obvious to one of ordinary skill in the art to have modified the system of Smith, as modified by Jensen, in the manner as claimed, and as taught by Zhu, for

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the benefit of providing the user with voice and multi-media data in one carrier simultaneously.

5. Re claim 10, the combination of Smith & Jensen further discloses that wherein the filter factors are factors of a first-mode low pass filter. (In Jensen, see fig. 4: 121, col. 2, lines 59-60. Furthermore, one skilled in the art would know that GSM systems utilize filter factors that are factors of low pass filter.)

6. Claim 13 is a method claim corresponding to system claim 7. Hence, the elements in system claim 7 would have necessitated the steps performed in method claim 13. Therefore, claim 13 has been analyzed and rejected w/r to claim 7.

7. **Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al (hereinafter Smith) (US Patent 5,796,772) and Jensen et al (hereinafter Jensen) (US Patent 6,362,762 B1), and further in view of Ruha et al (hereinafter Ruha) (US Publication 2003/0067404 A1).**

8. Re claim 12, the combination of Smith & Jensen further discloses that wherein the output of the PN code generator is n bits, n being a multiple of 2. But the references of Smith & Jensen fails to specifically disclose the output of the delta-sigma modulator is 1 bit, and the filter factors are n bits, n being a multiple of 2. However, Ruha does. (See paragraph 8)

Ruha discloses an adaptive sigma-delta data converter for mobile terminals. It is capable to perform ADC functions on a received RF signal with different types of mobile communication device operational modes. The sigma-delta modulator consists of a loop filter that feeds a quantizer, and analog feedback path that includes a DAC. The quantizer typically is a 1-bit quantizer for linearity purposes.

Therefore, taking the combined teachings of Smith, Jensen & Ruha as a whole, it would have been obvious to one of ordinary skill in the art to have modified the system of Smith, as modified by Jensen, in the manner as claimed, and as taught by Ruha, for the benefit of achieving linearity and higher resolution. (See paragraph 8)

Allowable Subject Matter

9. Claims 1-6 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter: The art of record does not suggest the respective claim combinations together and nor would the respective claim combinations be obvious with:

11. Re claim 1, the limitation, *"A multi-mode communication device comprising: a first switch for receiving an analog signal; a delta-sigma modulator for sampling the analog signal inputted through the first switch when operating in a first mode; an analog-to-digital converter for sampling the analog signal inputted through the first switch when operating in a second mode; a second switch for selectively receiving an output of the delta-sigma modulator and an output of the analog-to-digital converter; a plurality of sequential convolution modules for multiplying filter factors by the output of the delta-*

sigma modulator in the first mode to generate first-mode waveforms, and multiplying PN codes by the output of the analog-to-digital converter in the second mode to generate second-mode output waveforms; and a selection unit for delaying outputs of the sequential convolution modules by a predetermined time in the first mode to restore first-mode output waveforms". Claims 2-6 depend on claim 1.

12. Claims 8 & 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Re claim 8, the limitation, "*The multi-mode communication device of claim 7, wherein each of the convolution modules includes: a memory for storing the filter factors; a third switch for selectively receiving the filter factors and the output of the analog-to-digital converter according to the first mode or the second mode; a PN code generator for generating PN codes in the second mode; a fourth switch for selectively receiving the output of the delta-sigma modulator and the PN codes according to the first mode or the second mode; a multiplier for multiplying the filter factors with the output of the delta-sigma modulator in the first mode, and for multiplying the output of the analog-to-digital convertor by the PN codes in the second mode; and an accumulator for accumulating the outputs of the multiplier to generate output waveforms". Claim 11 depend on claim 8.*

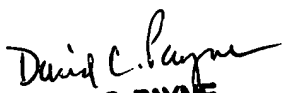
Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Flores whose telephone number is 571-270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LF
February 12, 2007


DAVID C. PAYNE
PRIMARY PATENT EXAMINER